LETTERS TO THE EDITOR

Subclavian artery involvement by apical chest tumors: A specific indication for the transmanubrial approach

To the Editor:

At present, apical chest tumors can be approached with several techniques mainly depending on the location of the tumor in the cervicothoracic area, the anatomic structures that have to be resected to allow a radical operation, and sometimes the surgeon's preference.

One of the most important critical difficulties in surgical management of these tumors is the safe dissection and the possible resection of the subclavian artery and vein.

The Paulson approach[1] provides excellent exposure for tumors of the superior sulcus and permits a safe pulmonary and chest wall resection; in case of vertebral infiltration, hemicorporectomy can also be performed. With this approach, however, the subclavian vessels cannot be controlled.

The hemi-clamshell[2] approach is excellent when lung and mediastinal structures are invaded by anterolateral tumors and extended resection is required. Hemicorporectomy without spinal cord control, but no hemivertebrectomy, is possible through the hemi-clamshell approach. When hemivertebrectomy is required, a further posterior approach is normally necessary. However, even with this technique, the involvement of the subclavian artery is critical: in fact, its passage through the pincer formed by the first rib below, the clavicle above, and the anterior scalenus muscle behind, makes safe control difficult when the artery is infiltrated.

Cormier,[3] in 1970, reported a transcervical approach for surgery of the subclavian vessels that was adopted in 1981 by Dartevelle and colleagues[4] at the Marie Lannelongue Hospital in Paris and then largely popularized, in 1993, by Dartevelle's group.[5] This technique solved the problem of resecting the median half of the clavicle, thereby exposing the artery in its critical portion. The functional and cosmetic disadvantages of this approach, however, limited the acceptance and worldwide diffusion of the technique for the treatment of apical chest tumors.

The transmanubrial osteomuscular sparing approach recently described[6] may be the best choice in this setting. As previously reported,[6,7] this cervicothoracic approach is superior to the classic transcervical approach, is less invasive, and allows a better exposure of the thoracic inlet and outlet. This approach is very different from the technique proposed by Nazari[8]; in fact, there is no section of any muscular insertion, the clavicle is not divided, and the sternoclavicular joint is maintained, allowing a larger exposure.[6,7] The L-shaped resection of the manubrium and of the first cartilage, followed by the resection of the costoclavicular ligament, allows the retraction of the osteomuscular flap and, by opening the space between the clavicle and the first rib, permits complete vascular control.

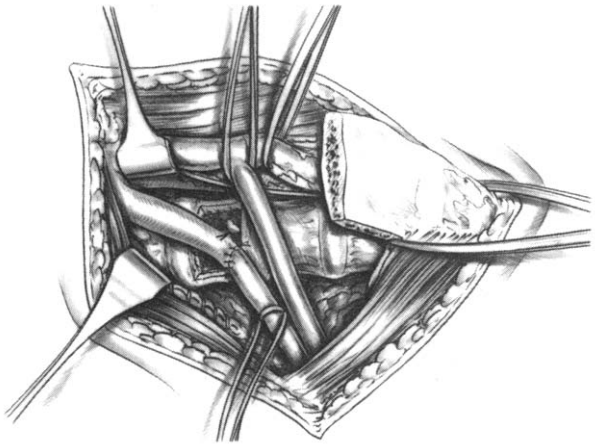

Fig 1. Left transmanubrial approach with subclavian artery resection and reconstruction by an end-to-end anastomosis, associated with vertebral D1 hemicorporectomy for a pT4, pN0 non–small cell lung cancer.

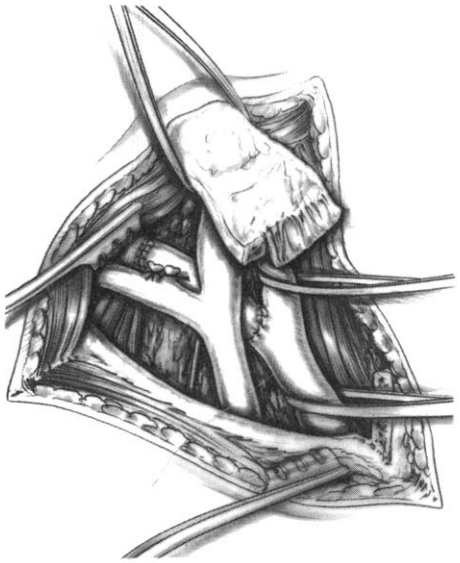

Fig 2. Right transmanubrial approach with subclavian artery resection and reconstruction by interposition of a polytetrafluoroethylene graft for a pT4, pN0 non–small cell lung cancer.

The subclavian artery can be safely exposed through the subadventitial plane when there is only a contact with the tumor or when the infiltration is limited to this plane; when the invasion of the artery is complete, it can be resected and then reconstructed directly by an end-to-end anastomosis (Fig 1) or

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by interposition of a polytetrafluoroethylene graft (Fig 2). Thereby, the en bloc resection of the tumor with the cervicothoracic structures involved (eg, subclavian artery, first rib, lung) is safely achieved. In metastatic tumors, a single lung wedge resection can be sufficient to perform a radical operation; in primary lung cancer, an upper lobectomy with dissection limited to the upper mediastinal lymph nodes can also be performed through this approach and may be adequate for apical tumors.[7]

Korst and Burt[2] recently reported the largest series of resections of cervicothoracic tumors by the hemi-clamshell approach, clearly reviewing in the discussion the different techniques. They acknowledged that no single technique is without drawbacks and no agreement exists as to what constitutes the optimal approach; however, in the conclusions they stated that the hemi-clamshell technique has significant advantages over the other approaches.

In agreement with the authors, we prefer the hemi-clamshell approach for resection of anterolateral tumors with chest and mediastinal invasion. However, those accustomed to the hemi-clamshell technique know how difficult it is to control and resect the subclavian artery through this approach, and Figs 2 and 3 in the article by Korst and Burt give an idea of such a problem. As a matter of fact, in that large series, no cases of subclavian artery resection were reported.

The choice among the different approaches for apical chest tumor should be based on the tumor localization, as well as on the structures that have to be resected. When tumors are clearly located in the apical chest region invading the first rib and subclavian artery and crossing the border of the thoracic inlet to reach the cervical structures, we prefer the transmanubrial osteomuscular sparing approach. This technique may be combined with classic posterolateral thoracotomy or with anterolateral muscle sparing thoracotomy when extensive lymph node dissection and lung resection are required; finally a midline posterior approach should be used when hemivertebrectomy is required.

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Reply to the Editor:

We agree with Spaggiari and Pastorino that exposure of the subclavian artery for resection, although not commonly indicated, plays an important role in the operative approach to apical chest tumors. However, we believe that the hemi-clamshell approach provides adequate exposure to this vessel.

To expose the subclavian artery adequately through a hemi-clamshell incision, two maneuvers must be stressed. First, the incision and dissection must extend well up into the neck, similar to the cervical portion of the transmanubrial approach described by Spaggiari. This cervical dissection will expose the first several centimeters of the subclavian artery, well past the origin of the vertebral artery. Second, the anterior scalene muscle must be divided, which helps expose more length of the subclavian artery. The operative diagrams in our article[1] do not depict the division of this muscle because vascular resection was not indicated in that particular patient. These two components of the dissection allow the subclavian artery to be exposed adequately for resection when involved by tumor.

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Well-differentiated thymic carcinoma: Is it thymic carcinoma or not?

To the Editor:

We read the article titled "Thymic Carcinoma: Current Staging Does Not Predict Prognosis" by Blumberg and associates of Sloan-Kettering Cancer Center (J Thorac Cardiovasc Surg 1998;115:303-9). Thymic carcinomas in this article consisted of type II malignant thymoma[1] and well-differentiated thymic carcinoma.[2] Our Nagoya City University series of thymic carcinoma consisted of 19 patients treated in